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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,235	02/23/2004	Feng Wang	NOVLP085/NVLS-2875	1043

22434 7590 07/27/2005

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EXAMINER	
TOLEDO, FERNANDO L	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/785,235	WANG ET AL.	
	Examiner	Art Unit	
	Fernando L. Toledo	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 9/27/04, 3/29/05, 6/27/05
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following reason:

It is noted that there are number of co-pending applications filled related to the instant application. However, the applicant fails to disclose the co-pending applications that related to the instant application as required under 37 CFR 1.56. "Information relating to or from co-pending United States Patent applications, the individuals covered by 37 CFR 1.56 have a duty to bring to the attention of the examiner, or other Office official involved with the examination of a particular application, information within their knowledge as to other co-pending United States applications which are "material to patentability" of the application in question. As set forth by the court in Armour & Co. v. Swift & Co., 466 F.2d 767, 779, 175 USPQ 70, 79 (7th Cir. 1972)." Therefore, applicant is requested to provide the serial numbers of all the co-pending application that related to the instant application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 – 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lukas et al. (US Patent Application Publication US 2004/0096672 A1) in view of Cho et al. ("Plasma Treatments of Molecularly Templated Nanoporous Silica Films").

4. In re claims 1, 25 and 32, Lukas, in the US Patent Application Publication US 2004/0096672 A1; figures 1a – 3 and related text, discloses providing a precursor layer on a substrate, the layer comprising a porogen in a dielectric matrix (¶ 0024) and exposing the precursor to plasma to remove the porogen from the precursor layer to create voids within the dielectric matrix (¶ 0028).

Lukas does not disclose applying a silanol capping layer to the dielectric matrix.

However, Cho, in the article, "Plasma Treatments of Molecularly Templated Nanoporous Silica Films" discloses applying a silanol capping layer to the dielectric matrix to make the surface more hydrophobic (page G35, second column).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a silanol capping layer to the invention of Lukas, since, as taught by Cho, it will make the surface of the dielectric matrix more hydrophobic.

5. In re claims 2 and 26, Lukas discloses further exposing the precursor to ultraviolet radiation to remove at least a portion of the porogen before exposing the precursor layer to the plasma containing silanol capping agent provided therein (¶ 0054).

6. In re claim 3, Lukas discloses wherein the dielectric matrix includes silicon and oxygen (¶ 0025).

7. In re claim 4, Lukas discloses wherein the dielectric matrix includes silicon, oxygen, hydrogen and carbon (¶ 0025).

8. In re claim 5, Lukas discloses wherein the dielectric matrix is derived from at least one of TEOS, MTEOS, DMDEOS, TMOS, MTMOS, DMDMOS, TMCTS, OMCTS, BTEOSE and BTEOSM (¶ 0025 and 0030).

9. In re claim 6, Lukas discloses wherein the porogen is an organic polymer ¶ 0026).

10. In re claim 7, Lukas discloses wherein the precursor layer is formed by CVD, a print process, dip casting, a spin on process, a spray on process, or supercritical dielectric infusion in a polymer matrix (¶ 0028).

11. In re claims 8, 9, 29 and 30, Lukas in view of Cho discloses wherein the silanol capping agent includes one or more of a silane amine, a disilazane, a cholorsilane, an aldehyde, an alkylsiloxane and an alkyl alkoxysilane (page G35, second column).

12. In re claims 10 and 33, Lukas in view of Cho discloses wherein the silanol capping agent is introduced to the plasma using a carrier gas (¶ 0028).

13. In re claims 11 and 36, Lukas in view of Cho discloses wherein the silanol capping agent is introduced to the plasma without using a carrier gas (¶ 0028).

14. In re claims 12 and 27, Lukas discloses wherein the plasma further includes a reducing gas (¶ 0053).

15. In re claims 13 and 28, Lukas discloses wherein the reducing gas is formed from at least one of hydrogen, ammonia, carbon monoxide and methane (¶ 0055).

16. In re claims 14 and 35, Lukas discloses wherein the plasma further includes an oxidizing gas (¶ 0061).

17. In re claim 15, Lukas discloses wherein the oxidizing gas is formed from at least one of carbon dioxide, nitrous oxide and oxygen (¶ 0061).

18. In re claims 16 and 34, Lukas discloses wherein the plasma further includes at least one of nitrogen, argon and helium (¶ 0061).

19. In re claims 17 and 39, Lukas discloses wherein the plasma source to generate the plasma has a power ranging between about 100 and about 2000 Watts (¶ 0063).

20. In re claim 18, Lukas discloses wherein a high or low frequency plasma source is used to generate the plasma (¶ 0028).

21. In re claim 19, Lukas discloses wherein a combination of low and high frequency plasma source(s) is/are used to generate the plasma (¶ 0028).

22. In re claim 20, Lukas discloses wherein the plasma is a downstream plasma (¶ 0028).

23. In re claims 21 and 40, Lukas discloses wherein the substrate temperature during plasma exposure ranges between about 100 and about 400 degrees Celsius (¶ 0063).

24. In re claims 22, 31 and 37, Lukas in view of Cho discloses wherein the dosage of silanol capping agent provided in the plasma (as a vapor) is between about 0.2 and about 20ml/minute (page G36, first column).

25. In re claims 23 and 41, Lukas discloses wherein the plasma is provided in a chamber of between about 1 and about 10 Torr (¶ 0063).

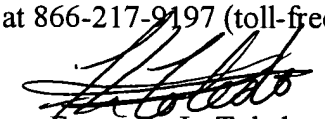
26. In re claims 24 and 38, Lukas discloses wherein exposing the precursor layer to a plasma occurs for a time period ranging between 5 seconds and 20 minutes (¶ 0063).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-1867. The examiner can normally be reached on Mon-Thu 7am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Fernando L. Toledo
Examiner
Art Unit 2823

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21 July 2005